



FIBER OPTIC TRAFFIC SENSORS

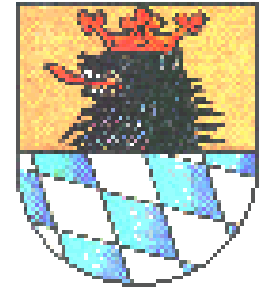
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Measurement Specialties, Inc.



Fred Motzko
Sensor Line

August, 2000

Sensor Line History



- **Founded in 1996**
- **Spin-off from DaimlerChrysler (MBB)**
- **Located in Schrobenhausen, Germany (60 km from Munich)**
- **MSI is the exclusive distributor for the Americas**



Capabilities



Airport Runway Sensor

Traffic Sensor



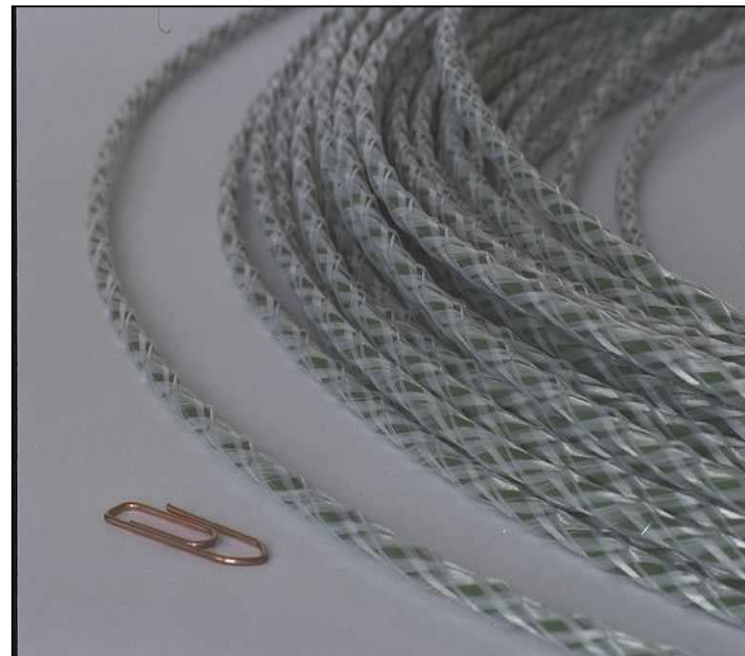
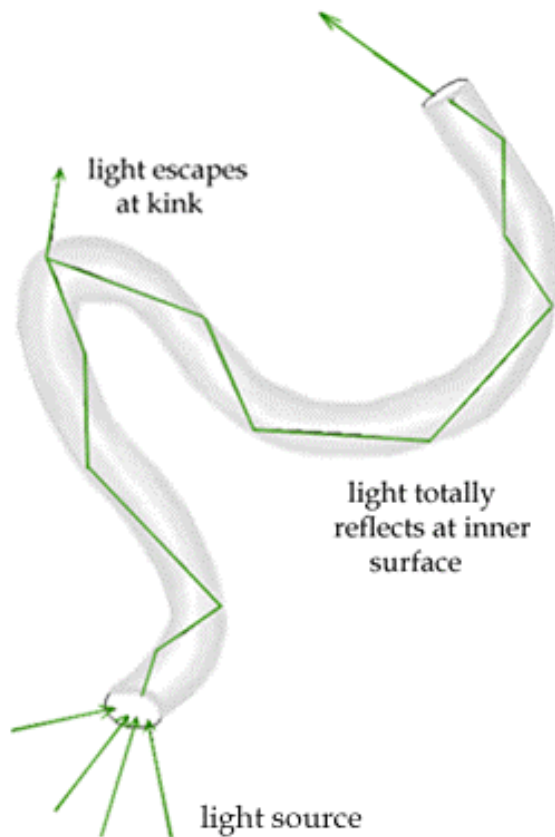
Railroad Sensor

Automotive Sensor



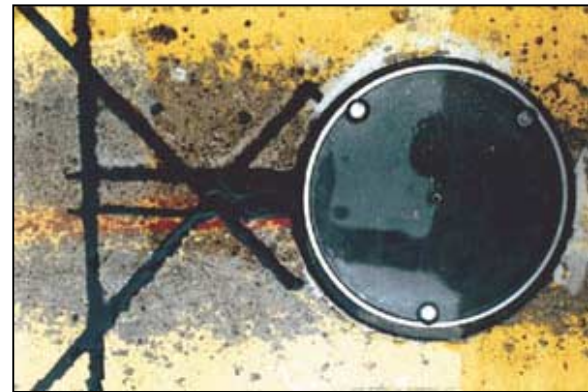
Fiber Optic Load Sensor

- **Attenuation of light due to Microbending**
- **Light attenuation of 10-50% due to axle load**



Airport Sensors

- **First installations of prototypes at Zurich Airport in 1994**
- **Sensor lengths up to 6m (20') and feeder cables to 400m (1,300')**
- **Immune to EMI; Passive; Independent of Speed; Failsafe**
- **Verified and approved for aircraft ground control operations**
- **In active operation for Stop Bar Control since middle of 1999**



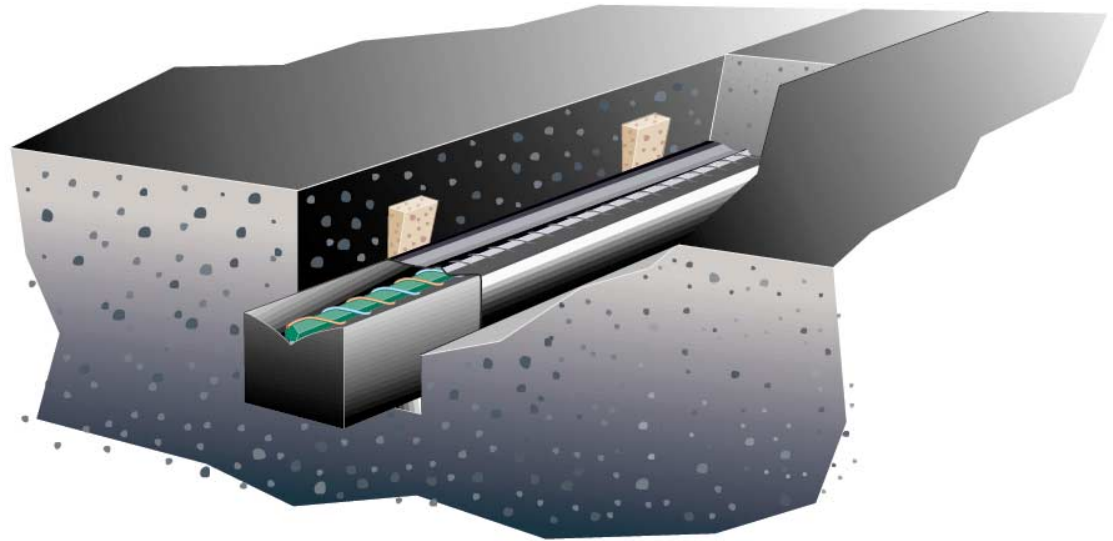
Traffic Sensors

- **Installed base of \approx 1,000 sensors in Germany, France, Brazil, South Africa, Austria, etc.**
- **Mainly used for Speed Enforcement Cameras**
- **Manufactured for 3+ years**



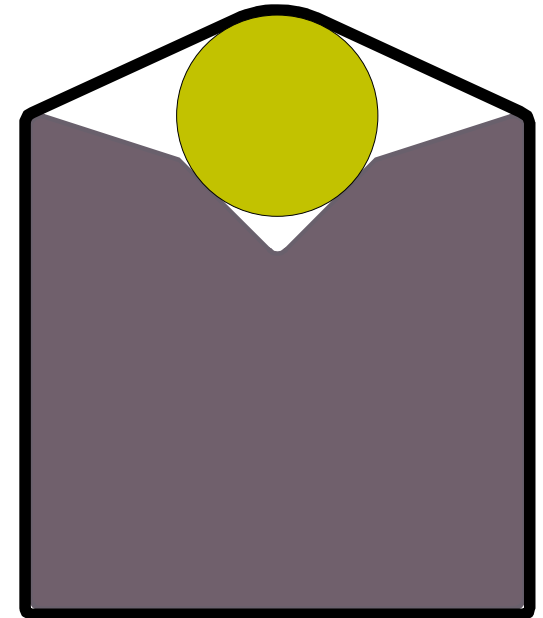
SPZ & SPT Fiber Optic Traffic Sensors

- Optical Fiber (230 μm) spiral wrapped on pentagon
- Sets in a "V" shaped elastomer profile
- Encased in polymer jacket
- Connected to optical fiber transmission cable



SPZ & SPT Fiber Optic Traffic Sensors

- Sensitive to vertical pressure only
- Flexible and elastic
- No metal parts
- Insensitive to environmental influences
- Wide operation temperature range
- Simple installation



Installation

Cut slot 15mm wide x \approx 30mm deep (5/8" x 1 1/4")



Installation

Clean and dry road; place duct tape along edges



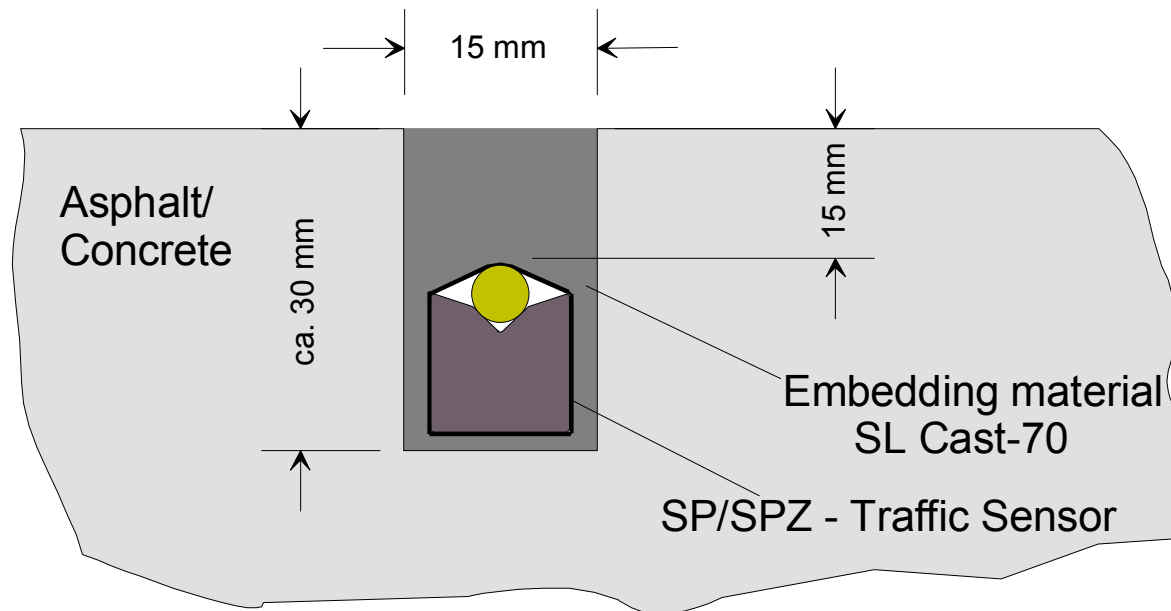
Installation

Pour small amount of SL Cast in the bottom of the slot



Installation

Place sensor into SL Cast; hold in place with wedges



Installation

Fill slot with SL Cast



Installation

When SL Cast is cured, open for traffic



SPZ & SPT Traffic Sensors

- **Precise and Reliable Detection**
- **Wide Temperature Range**
- **High Sensitivity**
- **Immune to Road Noise**
- **Flush Installation**
- **Tolerant to Variable Installation Depth**
- **Elastic System -- Good Dynamic Range; Fast Response**
- **Excellent Mechanical and Chemical Resistance**





SPZ Traffic Sensors

- **Length: 2m to 5 m (6' to 15')**
- **Cable: 1m to 250m (3' to 800')**

SPT Traffic Sensors

- **Length: up to 5 m (15')**
- **Cable: up to 3m (10')**

Electronic Interfaces



Common Features **MA-100, MA-110, & MD-200**

- **Free of adjustments**
- **Uniform Trigger Level @ 1% light change**
- **Integrated LED Light Source**
- **Photo diode receiver**
- **Digital opto coupled outputs**
- **Inherent self-testing capability**

Electronic Interfaces

MA-100



- Min of 13dB dynamic range
- 1 Channel interface
- Linear Output
- Min speed -- 1kph (0.6 mph)

Electronic Interfaces

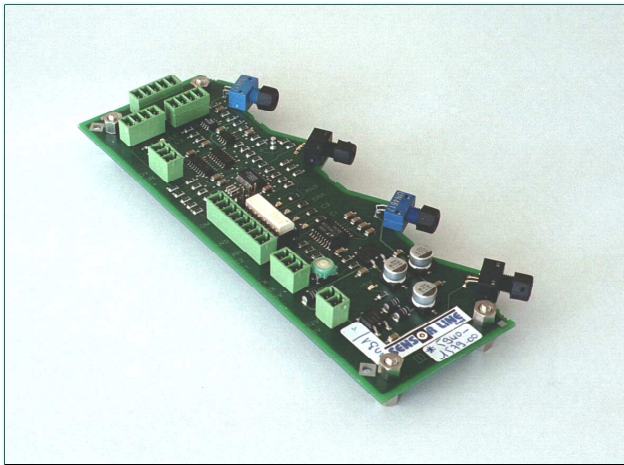
MA-110



- Min of 23dB dynamic range
- 1 Channel interface
- Automatic Light Control - more fault tolerant
- Min speed -- 1kph (0.6 mph)

Electronic Interfaces

MA-200



- 2 Channel interface
- Works to "0" kph (0 mph)
- 10 dB dynamic range
- Flexible Output (RS232; Digital output)
- Optimized for toll applications

Applications

Speed Enforcement



Classification



Red Light Camera Trigger



Toll Treadles



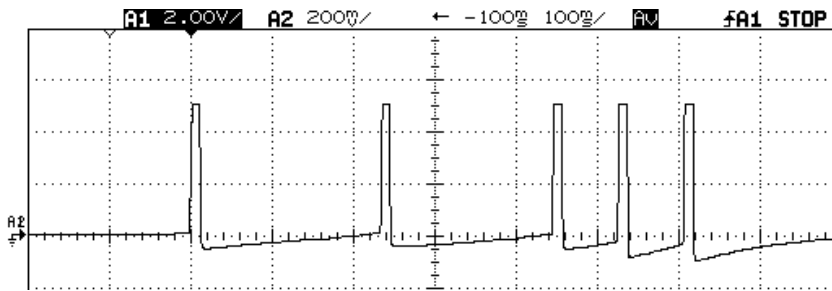
Speed Enforcement

- 3 or 4 Sensors Used -- Double Measuring
- Timing between Sensors (Sensors 1m apart)
- Approved by PTB -- Accurate to better than 1 kph!
- Accurate even in noisy roads



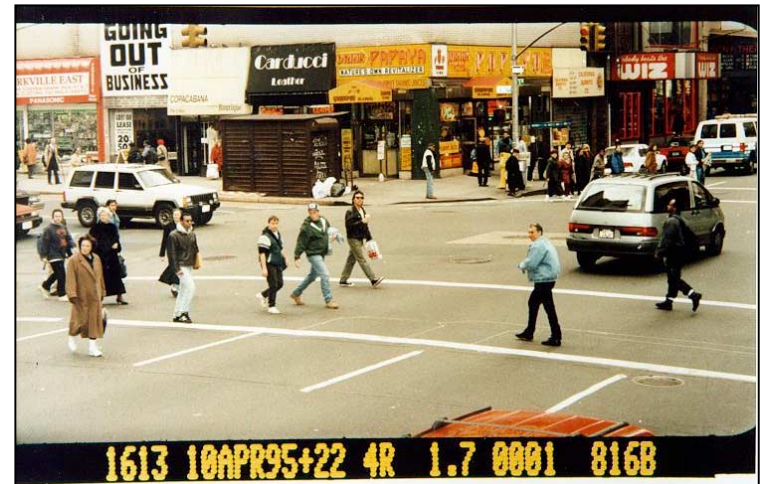
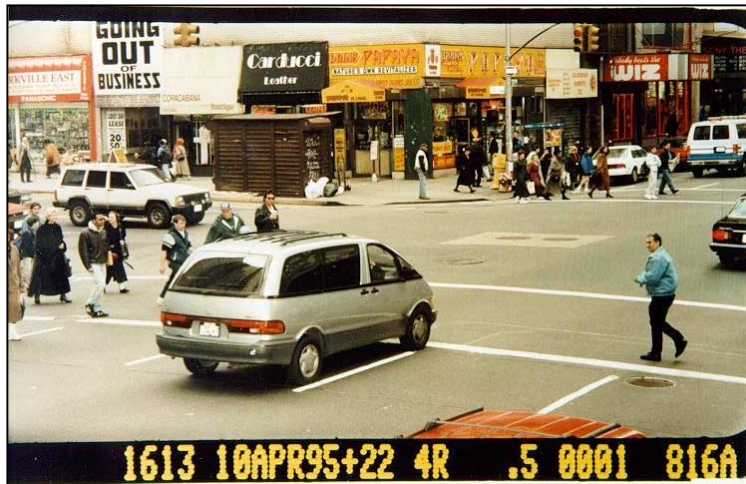
Vehicle Classification

- **Accurate speed \therefore Accurate Classification**
- **No Bow Waves; Uniform Trigger**
- **Immune to any EMI! (Laughs at Lightning...)**
- **Install the Sensor over the Loop**



Red Light Camera Trigger

- Work at any speed [stationary to 250(+) kph]
- Install the sensor over the loops -- small footprint
- Information specific to the vehicle
- Defined trigger point



Toll Treadle

- Any Speed -- DC to High Speed
- High Reliability -- No moving parts
- Solid State Electronic Trigger @ 1% Light Loss
- Immune to EMI
- Installs Directly in Road
- Compatible with toll system interfaces via MD-200

